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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of	:	S J Savory et al
Serial No.	:	09/975,830
Filed	:	October 12, 2001
For	:	Generation of Variable Differential Group Delay
Examiner	:	J L Pritchett
Art Unit	:	2872

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I hereby certify that this correspondence is being transmitted to the above – identified examiner at the United States Patent and Trademark Office (703) 872-9318 on July 25, 2003
Name of person signing Jennifer J. Ramirez
Signature__________

RESPONSE TO OFFICE ACTION MAILED MAY 2, 2003

Honorable Director of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir,

In response to the Office Action dated May 2, 2003, applicants respond as follows. No claim amendments are made at this stage because applicants believe the claims under current consideration to be both novel and non-obvious over the cited references for the following reasons:-

The Examiner rejects claim 21 under 35 USC § 102(e) as being anticipated by Shieh (US 6,384,956). However, reconsideration is requested because Shieh does not describe a device for differential group delay but rather a polarization controller.

As described in Shieh at column 1, lines 31 to 34: "polarization controllers are one method used to adjust the polarization of an input optical signal to an arbitrarily set fixed and known output value regardless of the input polarization." The present

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invention, in contrast, relates to a variable differential group delay in which different delay is introduced between tw orthogonally polarized modes of an input signal so that one mode is delayed with respect to the other. Such a delay may be used to compensate for polarization mode distortion (PMD), for example.

Furthermore, although Shieh does indeed have four elements, these are not birefringent elements as required in claim 21 and, thus, they do not introduce any differential delay between the orthogonally polarized modes of the input signal.

All that Shieh describes is a polarization controller for adjusting the polarization of an input optical signal.

The Examiner further rejects claims 1 to 9 and 2 to 25 under 35 USC § 103(a) as being unpatentable over Shieh in view of Noé "Polarization Mode Dispersion Compensation at 10, 20 and 40 Gb/s with Various Optical Equalizers". While the Examiner is correct in citing Noé as disclosing the use of a quarter, half, quarter wave plate arrangement, this is wholly different to the 1:2:1 birefringent element arrangement of the present invention.

In Noé, the quarter, half, quarter wave plate arrangement serves to convert the polarization of an input optical signal from elliptical to circular and then back to elliptical with a 45 degree azimuth angle. This is described in Noé at page 1609, column 2. The choice of this quarter, half, quarter wave plate arrangement is described as being to avoid the principle states of polarization (PSD) from appearing elliptical – see page 1610, column 1.

Furthermore, it is clear from figure 17, and also from the passage cited by the Examiner on page 1612, column 2, that it is not the quarter, half, quarter wave plate arrangement that introduces differential group delay, but the three polarization maintaining fiber (PMF) sections which according to Noé have a differential group

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delay of 10 picoseconds each. In Noé, the quarter, half, quarter wave plates are used to control the polarization of the input ptical signal not to introduce differential group delay. Furthermore, the differential group delays (i.e. the PMF sections) are not arranged in the ratio 1:2:1.

Moreover, claim 1 introduces a further requirement that the birefringent elements are controlled such that "a change in the orientation between the first and second elements in equal and opposite to a change in orientation between the second and third elements". This is a specific limitation of the claim and is nowhere described in Noé. The advantage of this specific arrangement is that it provides a symmetrical relative rotation of the signal PSPs and principle axis about the central birefringent element. This means that, when used in a PMD compensator, the variable differential group delay of the present invention can compensate for first order PMD without introducing any second order PMD as described in the present application at page 6, lines 20 to 28.

Accordingly, it is submitted that the claims clearly distinguish from the prior art, and favorable reconsideration of the claims currently pending before the Examiner is requested.

July 25, 2003

Respectfully submitted,

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